

15 Practical Procedures

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SABER'S

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قال تعالى:
 فَلَا تَحْسَبَنَّ اللَّهَ مُخْلِفَ وَعْدِهِ رُسُلَهُ
 إِنَّ اللَّهَ عَزِيزٌ ذُو انْتِقَامٍ
 يَوْمَ تُبَدَّلُ الْأَرْضُ غَيْرَ الْأَرْضِ وَالسَّمَوَاتُ
 وَبَرَزُوا لِلَّهِ الْوَاحِدِ الْقَهَّارِ
 إبراهيم ٤٧ ، ٤٨

- They provide **rapid systemic action** and allow relatively large doses to be absorbed.
- Suitable IM sites include the **deltoid muscle**, **dorsogluteal site**, **ventrogluteal site**, **lateral thigh vastus lateralis**, **quadriceps** muscle, and the **rectus femoris** muscle.
- Remember to avoid sites of inflammation, swelling, infection, or skin lesions.
- Introduce yourself, confirm the **identity** of the patient, **explain** the procedure, and obtain verbal consent.
- Wash** your hands and put on a pair of gloves.
- Always check you have the **correct drug**, **correct dose** and that it is within **date** before injecting it.
- Draw up the medication using a **21-gauge needle** and have a colleague double **check** the medication, **dose**, and **expiry date**.
- Expel any air in the syringe and replace with a **25-gauge needle**.
- Inspect the proposed site for **adequate muscle mass**.
- Clean the injection site with the alcohol swab.
- IM injections should be given at a **90° angle** to ensure the needle reaches the muscle, and to **prevent pain**.
- A good way to ensure accuracy and avoid a needle-stick injury is to rest the heel of the palm on the thumb of the non-dominant hand.
- Pull the skin **downwards** or to one side at the intended site. (**THE UPPER OUTER QUADRANT OF THE GLUTEAL MUSCLE** "for example")
- Hold the syringe between the thumb and forefinger and insert the needle at full depth.
- Draw back on the syringe to **ensure the needle is not in a vein**.
- Slowly inject the medication.
- After needle insertion and injection **allow 10 seconds** before removing the needle to **facilitate diffusion** of the medication into the muscle.
- Withdraw the needle and **wipe** the area clean with cotton wool.

C. Intra-dermal injections

- The ID route provides a **local**, rather than systemic effect and is used primarily for **diagnostic purposes** such as allergy or tuberculin testing.
- This involves the same preliminary work-up above except a **25-gauge needle is inserted at a 10-15° angle, bevel up**, just under the epidermis.
- Up to **0.5ml** is injected until a **wheal** appears on the skin surface—just as you would when creating a bleb of local anaesthetic.

1. Injections

- Three commonly used routes of administration are subcutaneous (S/C), intramuscular (IM) and intradermal (ID).

Equipment

- Syringe (size depends on injection).
- Needles: 25-gauge for S/C route; 21-23 gauge for IM route.
- Extra 21-gauge needle for drawing up dose.
- Alcohol swab.
- Gloves.
- Cotton wool.
- Sharps bin.
- Medication for injecting.

Procedures

A. Subcutaneous injections

- The S/C route is used for a **slow absorption** of medication and is ideal for drugs such as **insulin**.
- Introduce yourself, confirm the **identity** of the patient, explain the procedure, and obtain verbal consent.
- Wash your hands** and put on a pair of gloves.
- Always check you have the **correct drug**, **correct dose**, and that it is within **date** before injecting it.
- Draw up the medication using a **21-gauge needle** and have a colleague double **check** the medication, **dose**, and **expiry date**.
- Expel any air in the syringe and replace with a **25-gauge needle**.
- Clean the injection site with the alcohol swab.
- Pinch a fold of skin so as to lift the adipose tissue away from the underlying muscle.
- Insert the needle **horizontally** into the fold and **drawback to ensure you are not in a vein**.
- Now **inject** the medication.
- Withdraw the needle and apply the **cotton wool** to the site to mop up any bleeding.
- Suitable S/C sites include the **forearm**, **triceps** area, and **abdomen**.

B. Intramuscular injections

- IM injections are administered through the epidermis, dermis, and S/C tissue into the muscle.

2. Venepuncture

Equipment

- Gloves
- Sticky tape
- Alcohol swabs
- Gauze/cotton wool
- Tourniquet
- A needle (try 12G first), a syringe and blood collection bottle

Procedure

Using a needle and syringe

- Introduce yourself, confirm patient's **identity**, **explain** the procedure, and obtain **verbal consent**.
- The patient should be lying or sitting comfortably with the arm from which blood is to be taken **resting on a pillow**.
- Select a vein site—usually the **antecubital fossa**.
- Apply the **tourniquet** proximal to the puncture site and recheck the vein.
- Put on gloves and ask the patient to **clench** their fist a few times.

The angle between the needle and the skin must be varied based upon the depth and diameter of the target vein.
 A A shallow angle must be used for small and superficial veins.
 B A steeper angle must be used for deeper veins.
 C A butterfly-type needle permits the shallowest angle of entry for very small and superficial veins.

- Cleanse the area with an alcohol swab in spirals, inside to out.
- Attach the needle to a syringe and unsheath it.
- Use the thumb of your non-dominant hand to gently **anchor** the skin just below the puncture site.
- Warn the patient to expect a 'sharp scratch' and to not move their arm.
- Insert the needle firmly through the skin, **bevel upwards**, at an angle of **20-40°** over the vein.
- With experience, you will feel a slight 'give' as the vein is entered and blood will visibly enter the hub (plastic portion) of the needle ('flashback').

12. Carefully holding the needle in position, pull back on the plunger. Do this by holding the needle and syringe in the non-dominant hand, once in place, and pulling back with the dominant hand.
13. When enough blood is taken, release the tourniquet before removing the needle from the vein.
14. Apply a clean cotton wool ball or folded gauze to the puncture site as the needle is withdrawn. Pressure should be applied for ~1 min (ask the patient to do this for you, if they are able).
15. Apply a plaster to the site, thank the patient.
16. Vacuum blood tubes are filled by puncturing the rubber top with the needle and allowing the blood to enter the tube.
17. Remember to label the tubes correctly - ideally at the patient's bedside and dispose of sharps in a sharps bin.

3. Peripheral IV cannulation

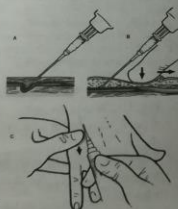
A thin tube 'line' is inserted into a vein allowing easy venous access which is used in many situations, including the administration of fluids and IV medication.

Equipment

- Gloves.
- Alcohol swabs.
- Tourniquet.
- Saline for injection.
- 5ml syringe.
- Sticky tape.
- Gauze/cotton wool.
- A cannula of appropriate size.

Procedure

1. Introduce yourself, confirm patient's identity, explain the procedure, and obtain verbal consent.
2. The patient should be lying or sitting comfortably with the arm in which the cannula is to be inserted resting on a pillow.
3. Apply the tourniquet to the arm and identify a suitable vein (often those that can be felt are more reliable than those that are seen). The vein should be superficial and have a straight course for a few centimeters.
4. Put on the gloves and clean the overlying skin with the alcohol swab.



Stabilization of the vein during venipuncture.
A. Without stabilization, the vein may kink or roll away from the tip of the hypodermic needle.
B. Gentle stabilizing pressure with the operator's fingertip allows entry into the vein, as shown in C.

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5. Remove the cannula from its packaging.
6. Ensure that the cannula is functioning properly by slightly withdrawing the needle and replacing it. Fold down the 'wings' and open and close the port on the top.
7. Warn the patient to expect a 'sharp scratch' and to not move their arm.
8. Insert the cannula firmly through the skin, level upwards, at an angle of 20-40° over the vein.
9. With experience, you will feel a slight 'give' as the vein is entered and blood will visibly enter the hub (plastic portion) of the cannula ('flashback').
10. Once the flashback is seen, hold the needle in place with one hand and slide the cannula off the needle—into the vein—with the other. Once the cannula is fully inserted, the needle should be sitting just within it, preventing blood from spilling.
11. Release the tourniquet.
12. Press over the vein at the tip of the cannula, remove the needle, and dispose of it safely in a sharps bin.
13. Put the cap on the cannula and fix it in place with the sticky dressing.
14. Draw up the saline into the syringe and 'flush' it through the cannula using the port on the top. Watch the vein—if the cannula is misplaced, the saline will enter the subcutaneous tissues causing swelling.
15. Don't forget to do this—it confirms that the cannula is working and clears it of blood which would form a clot.

Sizing cannulae

- Like needles, cannulae are colour-coded according to size.
- Each is given a 'gauge' which has an inverse correlation to the external diameter.
- The standard size cannulae is 'green' or 18G but for most hospital patients, a 'pink' or 20G cannula will suffice. Even blue cannulae are adequate in most circumstances unless fast flows of fluid are required.

Gauge	External diameter (mm)	Length (mm)	Approximate maximum flow rate (mL/min)	Colour
14G	2.1	45	290	Orange
16G	1.7	45	172	Grey
18G	1.3	45	76	Green
20G	1.0	33	54	Pink
22G	0.8	25	25	Blue

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Hints

- Try to avoid the antecubital fossa. Although this is often the easiest place to see and feel a vein, cannulae at that site can become kinked and blocked whilst causing pain for the patient on bending the arm.
- Avoid an arm with a fistula or AV shunt.
- Bring a selection of different sized cannulae to the bedside allowing you to choose a smaller gauge if you experience problems.
- Don't be afraid to ask for assistance from nursing or auxiliary staff if the patient is likely to move their arm during the procedure.



Cannula

Double way (trochar + cannula)

- Inert (can be left maximally for days)

Scalp (شعر) بزرگ الحجم بقل البرق

رمادى (الأخضر)

For platelet transfusion

• 18 أخضر

With external jugular vein

• 20 بزر

• 22 أزرق

Used up to 15 years

• 24 أصفر أو بنفسجى

Used with neonates

• If obstructed do

o Massage of the veins

o Injection of saline

Scalp

One way

- Non inert (can be left maximally for hours to avoid phlebitis)

- Used in case of multiple IV drug injections

- 19 بزر For blood transfusion

- 21 أخضر

- 23 أزرق

- 25 برتقالى (للأطفال)

4. Blood pressure measurement

Theory

- BP is measured with a sphygmomanometer (sphyg).
- Usually at the brachial artery.
- A cuff is applied to the upper arm and inflated so as to cut off the arterial supply.
- The pressure is released slowly and a stethoscope used to listen for the blood flow. When the pressure in the cuff equals the systolic blood pressure, blood will audibly pulse through the artery.
- When the cuff pressure falls below the diastolic blood pressure, the blood will flow continuously and the sound of intermittent blood flow will disappear.

Equipment

- A (functioning) sphygmomanometer.
- An appropriately sized cuff.
- Stethoscope.

Procedure

- Introduce yourself, explain the procedure, and obtain verbal consent.
- Check the sphyg is working and the dial reads '0'.
- The patient should be sitting, relaxed for 5 minutes beforehand.
- Apply the cuff to the upper arm with the air bladder anteriorly (over the brachial artery).
- Using your left arm, support the patient's arm so that it is held horizontally at the level of the mid-sternum.
- Close the valve (may be a screw or lever), monitor the patient's radial artery, and inflate the cuff until the radial pulse is no longer palpable.
- Listen over the brachial artery at the antecubital fossa—using the diaphragm or the bell of the stethoscope—while deflating the cuff at a rate of 2-3mmHg/sec.
- Note the point at which the pulsation is audible (Korotkoff phase I—the systolic BP)...
- And the point at which the sounds disappear (Korotkoff phase V—the diastolic BP).
- Record the BP as 'systolic/diastolic' to the nearest 2mmHg.

Hints

- In some normal people, the sounds may not disappear completely. In this case, a distinct muffling of the noise (Korotkoff phase IV) should be used to indicate the diastolic BP.

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- BP recording may be particularly difficult in a noisy hospital ward at the time of an emergency (which is when doctors are most often asked to record the BP) or when the BP is very low. In this case, a **rough estimation** of the systolic BP may be made **by feeling for the return of the radial pulse** as the cuff is deflated.

Indication	Width (cm)	Length (cm)	Bladder dimensions (cm)	Arm circumference (cm)
Small adult/child	10-12	18-24	12×18	<23
Standard adult	12-13	23-35	12×26	<33
Large adult	12-16	35-40	12×40	<50
Adult thigh cuff	20	42		<52

5. Recording a 12-lead ECG

- The term '12-lead' relates to the **number of directions** that the electrical activity is recorded from and is not the number of electrical wires attached to the patient!

Equipment

- An ECG machine capable of recording 12 leads.
- 10 ECG leads (4 limb leads, 6 chest leads)—should be attached to machine.
- Conducting sticky pads ('ECG stickers').

Procedure

- Introduce yourself, confirm the identity of the patient, explain the procedure, and obtain verbal consent.
- Position the patient so that they are sitting or lying comfortably with their upper body, wrists, and ankles exposed.
- Each electrode is attached by clipping it to the sticky pads and sticking them to the patient's skin.
- The leads are usually labelled. The limb leads are often colour-coded.

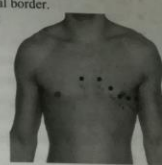
Right arm—red.

Left arm—yellow.

Right leg—Black.

Left leg—green.

- The arm leads are of medium length and should be attached to a **hairless part** of the patient's wrists.
- The leg leads and longest are **should be attached to the patient's ankles** (the hairless part just superior to the lateral malleolus is ideal).
- Position the chest leads as below:
 - V1—4th intercostal space at the right sternal border.
 - V2—4th intercostal space at the left sternal border.
 - V3—midway between V2 and V4.
 - V4—5th intercostal space in the mid-clavicular line on the left.
 - V5—left anterior axillary line, level with V4.
 - V6—left mid-axillary line, level with V4.
- Turn on the ECG machine. These are usually self-explanatory require just 1 button to be pressed—marked 'analyse' or 'record'.
- Check the calibration and paper speed:
 - 1mV should cause a vertical deflection of 10mm.
 - Paper speed should be 25mm/s (5 large squares per second).
- Ensure the patient's name, DOB, as well as the date and time of the recording are clearly recorded on the trace.
- Remove the leads, discard the sticky electrode pads.



Hints

- Encourage the patient to **relax** as muscle contraction will cause interference.
- Ensure that you cleanse the area gently with an **alcohol swab** before attaching an electrode to ensure a **good connection**.
- The AC mains electricity may cause interference. If this is the case, try turning off the fluorescent lights.
- An arterial sample is obtained to assess PH, PO₂, PCO₂, HCO₃⁻ and base excess/deficit. Sometimes also used for rapid assessment of electrolytes.

6. Arterial blood gas sampling

Equipment

- ABG kit (usually contains heparin-filled syringe, needle and vented cap).
- Gauze or cotton ball.
- Tape.
- Sterile gloves.

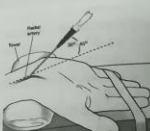
Procedure

- Wash hands and put on gloves.
- Verify patient identity, explain procedure, and obtain verbal consent. Be sure to warn the patient of potential pain and ask them to keep as still as possible.
- Note patient's **temperature** and **oxygen** support.
- Chose site for arterial puncture.

Radial

(No adjacent nerves or vessels so is the most commonly used site.)

- Assess for adequate ulnar arterial circulation** by obstructing the radial artery with finger-tip pressure.
- Ask the patient to make a **tight fist**, expelling blood from hand, maintaining pressure on radial artery.
- Ask them to open their hand and **watch for flushing of the palm**. This indicates adequate perfusion.
- Take the blood gas syringe, ensuring that the **heparin** has coated the inside by withdrawing and advancing plunger.
- Attach the needle and **expel the excess heparin**.
- Position the wrist in **extension**.
- Palpate the radial arterial pulse along its length using the middle and index fingers.
- Clean the skin.



Correct positioning for radial artery puncture and cannulation. Dorsiflexing the wrist and supporting it with a small towel facilitates palpation of the artery and provides the maximum working space. The needle or catheter-over-the-needle is aimed toward the oncoming blood flow and at a 30 to 45 degree angle to the skin.

- Having chosen a suitable spot, insert the needle with the **bevel facing towards the direction of blood-flow**, using an appropriate angle.
- Advance the needle **until arterial pressure fills the syringe**.
- Obtain a sample of 1-3ml and withdraw the needle.
- Apply pressure** to the puncture site using gauze or cotton ball until bleeding has stopped (**minimum 2 minutes**).
- Remove and discard the needle with care and place a vented cap on the syringe. Holding vertically, expel any air through the vent.
- Mix sample gently** and take to a blood gas analyser.

Femoral

- Position the patient with the **hip extended and slightly internally rotated**.
- Note that the femoral nerve is just lateral to the artery so **maintain a medial approach**.
- Procedure **as above** but use a **21-gauge** needle, aiming at the pulsation positioned between your index and middle finger.

Appropriate angles for needle insertion:

- Radial artery—45°.
- Femoral artery—90°.

Hints

- The key to success is carefully lining up the needle over a palpable pulsation—**take your time!**
- If there is no flash-back, **withdraw** the needle slightly, **change the angle and advance**. Note that most pain is from puncturing the skin so **do not remove needle fully** when repositioning.
- If there will be some delay in analyzing the sample, store the blood-filled syringe **on ice**.
- Sources of blood gas result errors:**
 - Air in the sample.
 - Delay in analyzing sample or delay in icing.
 - Excess heparin in the syringe.
 - Accidentally obtaining a venous or mixed arterio-venous sample.
 - Alterations in temperature.

7. Basic airway management

- An inadequate airway leads rapidly to hypoxaemia and, if uncorrected, brain damage and death.
- **Endotracheal intubation** remains the 'gold standard' for securing an airway and protecting the patient from aspiration.
- Airway management without intubation is an important skill to master and consists of the use of one or more of the following:
 - Triple maneuver
 - Facemasks
 - Oropharyngeal
 - Nasopharyngeal airways
 - Laryngeal masks
 - Other supraglottic devices e.g. Combitube.
- It may be carried out when intubation equipment or skills are unavailable, if intubation is difficult or on a patient with a partially obstructed airway.
- **Urgency** is an important factor in planning and securing an airway in the most appropriate manner. This will depend on risk of vocal cord injury, degree of patient co-operation, anatomy of airway, equipment to hand and your own experience.

Before you start

- Think about simple positioning and the recovery position of the patient especially for airway protection alone.
- **Assess for airway obstruction**
 - **LOOK** (into mouth and for chest/abdominal movement).
 - **LISTEN** (snoring/gurgling/wheezing)
 - **FEEL** (expired air).
- Complete airway obstruction is silent
- **Make sure that you have:**
 - Oxygen tubing.
 - Suction equipment.
 - Ambu-bag.
 - Rebreather bag.
- **Hints**
 - A fully conscious talking patient is able to maintain his/her own airway and needs no further assessment.
 - **Do not use head tilt or chin lift in suspected cervical spine injury** except as a last resort.

Hint

Do not use a head-tilt or chin lift in a patient with (or suspected to have) cervical spine injuries.



Jaw thrust

8. Nasogastric (NG) tube insertion

- A plastic tube is inserted through the nose, down the back of the throat, oesophagus and into the stomach.
- The 'bore' of the tube (large = 16, medium = 12, small = 10) is dictated by the tubes intended purpose.
- For short- or medium-term nutritional support in those with a defective swallow, a fine-bore tube is used.
- Larger bores are used to drain the stomach contents and decompress intestinal obstruction.
- **Contraindications:** severe facial trauma and basal skull fractures.
- **Complications:** aspiration, tissue trauma, electrolyte loss, tracheal or duodenal intubation, perforation of oesophagus or stomach.

Equipment

- Disposable gloves.
- Plastic apron.
- Drape.
- Lubricant gel.
- NG tube.
- Cup of water ± straw.
- 50ml syringe.
- Drainage bag (if necessary).
- Adhesive tape or steristrips and hypofix.
- Disposable vomit bowl.
- Paper towel.

Procedure

1. Introduce yourself, confirm the patient's identity, explain the procedure, and obtain verbal consent.
2. Wash hands thoroughly, put on gloves and plastic apron.
3. Ideally, the patient should be seated upright (often the head tilted slightly forwards can aid insertion).



Common causes of airway obstruction

- Tongue (due to unconsciousness).
- Soft tissue swelling (trauma, tumor).
- Foreign material (blood, vomit).
- Direct injury.
- Secretions.
- Bronchospasm.

Secure airways

A secure airway may be necessary in patients with the following:

- Apnoea.
- GCS < 9/15.
- High aspiration risk.
- Respiratory failure.
- Unstable mid-face trauma.
- Airway injuries.

Airway maneuvers

- The following are performed with the patient lying supine and all aim to open the airway with simple physical maneuvers.
- These are useful as a first step in managing a patient with a compromised airway and are used in conjunction with an oxygen mask.
- Also useful in situations where there are no airway devices available.
- If unsuccessful, you should go on to use additional equipment.

A. Head tilt

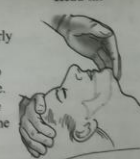
- Place hands around patient's forehead and tilt backwards so as to achieve upper cervical extension



Head tilt

B. Chin lift

- Usually used with the head tilt.
- Place the tips of the index and middle fingers of your right hand under the front of the patient's mandible.
- Lift upwards, pulling the mandible anteriorly



Chin lift

C. Jaw thrust

- Use this if there is suspicion of an injury to the cervical spine. A two-handed technique.
- Holding that patient from behind, place the fingers of both hands behind the angle of the mandible.
- Lift the mandible with these fingers whilst using your thumbs to displace the chin downwards, opening the mouth.

4. Examine patient's nose for deformity/obstructions and decide which nostril to use.

5. Use the tube to measure the distance xiphisternum → earlobe → tip of nose and note the distance.

6. Lubricate the first 4-8cm of tube. You may also wish to use local anaesthetic spray on patient's throat if available.

7. Pass the tube into the nostril, and then posteriorly, a short distance at a time. You will feel it turn the corner at the nasopharynx and another slight obstruction as it passes into the oesophagus.

8. If the patient is able, they should be asked to swallow as the tube passes the pharynx—a brief sip of water may help here.

9. Advance the tube as far as the pre-measured distance.

10. To check for correct placement, you may wish to aspirate some stomach contents with the syringe.

11. Secure the tube to the patient's nose with some tape, you may also wish to curl it back over their ear and secure it to their cheek.

12. Ensure that you record the procedure in the patient's notes.

Hints

- If resistance is felt, try rotating the tube whilst advancing. Never force.
- Partially pre-freezing the tube can ease its passage.
- An alternate test of correct placement: insert a small quantity of air (20-30ml) down the tube using the syringe whilst listening to the epigastrium with the stethoscope. You should hear the air entering the stomach.

9. Male urethral catheterization

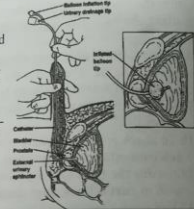
- A urinary catheter has a balloon near the tip which is inflated via a sidearm near the other end.
- Once inside the bladder, the inflated balloon prevents it falling—or being pulled—out.

Equipment

- A catheter pack (containing a kidney dish, a small pot with cotton balls, a sterile towel, sterile gauze, sterile gloves)
- Antiseptic solution or sachet of saline.

Procedure

1. Wash hands thoroughly. Confirm the patient's identity, explain procedure, and obtain verbal consent.
2. Unwrap all the equipment onto a trolley in an aseptic fashion and pour saline solution over the cotton balls.
3. **Position the patient supine** with genitalia exposed. Raise bed to a comfortable height.
4. Wash hands again and put gloves on. **Create a hole** in the centre of the towel and drape over the patient so the penis can be reached through the hole.
5. From here on, **use your non-dominant hand to hold the penis** with some gauze.
6. Clean the penis with the wet cotton balls, working away from the meatus. Remember to **retract the foreskin and clean beneath**.
7. **Lift penis to a vertical position**, carefully position the nozzle of the lubricant gel inside the meatus and **instill the full 10ml slowly**. (If proving problematic, can be aided by gentle 'milking' action.) **رفع القضيب** **لوضع عمودي**
8. Position the kidney bowl between the patient's thighs to catch spillages later.
9. The catheter will be in a plastic wrapper with a tear-away portion near the tip. Remove this portion, being careful not to touch the catheter.
10. **Insert the tip of the catheter** into the urethral meatus and **advance slowly but firmly** by feeding it out of the remaining wrapper.



1. **On passing through the prostate**, some resistance may be felt which, if excessive, may be countered by **adjusting the angle of the penis by pulling it to a horizontal position between the patient's legs**. **مقاومة تزل القضيب لوضع أفقي بين فخذي المريض**
2. On entering the bladder, urine should start to drain. Advance the catheter to the hilt to ensure the balloon is beyond the urethra.
3. Inflate the balloon with the 10ml of saline via the catheter side-arm. **املأ البالون بـ 10 سم محلول**
4. Warn the patient to alert you to any pain and watch his face.
5. Remove the syringe and withdraw catheter until resistance is felt. **القسط كده انحسرت**
6. Attach draining tube and catheter bag.
7. Replace the foreskin, clean and redress the patient as necessary.

Hints

You may wish to verify the presence of a **full bladder**.

Lack of urine drainage may be caused by: **blockage of gel, empty bladder or catheter misplacement**.

Attempt to aspirate urine using a catheter-tipped syringe. Feel for a full bladder. If there is any doubt about the position of the catheter, remove immediately (**deflating balloon first**) and seek senior advice. Always record the residual volume—this is essential in cases of urinary retention.

Consider the use of **prophylactic antibiotics before the procedure**.

Complications: pain, infection, misplacement and trauma.

Patients with **prostate disease** can often experience some **mild haematuria** following catheterisation. Don't worry but watch carefully and be sure the bleeding doesn't continue or form into clots.

► **Beware latex allergy!**

10. Female urethral catheterization

- A urinary catheter has a balloon near the tip which is inflated via a side-arm near the other end.
- Once inside the bladder, the inflated balloon prevents it falling—or being pulled out.



- Bear in mind that nurses tend to catheterize females if they are able—so if a doctor is asked to do it, expect the catheterization to be rather tricky!
- Always consider antibiotic prophylaxis.

Equipment

- A catheter pack (containing a kidney dish, a small pot with cotton balls, a sterile towel, sterile gauze)
- Sterile gloves.
- Saline solution.
- 5ml 1% lidocaine/lubricant gel in pre-filled syringe (e.g. Instilligel®).
- 10ml saline-filled syringe.
- A catheter bag.
- A female catheter (12F or 14F).

Procedure

1. Wash hands thoroughly. Confirm the patient's identity, explain procedure, and obtain verbal consent.
2. Unwrap all the equipment onto a cleaned (antiseptic) trolley in an aseptic fashion and pour saline over the cotton balls.
3. **Position the patient supine** with **knees flexed and hips abducted** with heels together. Raise bed to a comfortable height.
4. Wash hands again and put gloves on. Lay the towel and drape over the patient so the genitalia are exposed.
5. From here on, use your non-dominant hand to **hold the labia apart**, approaching the patient from the right hand side, leaning over their ankles so as to reach the genitalia from below.
6. **Clean the genitalia** with the wet cotton balls (using each once only), working in a pubis-anus direction.
7. Carefully position the nozzle of the lubricant gel inside the meatus and instilling most of the 5ml.
8. Position the bowl between the patient's thighs to catch spillages.
9. The catheter will be in a plastic wrapper with a tear-away portion near the tip. Remove this portion, being careful not to touch the catheter and apply a little lidocaine gel to the catheter tip.
10. **Insert the tip of the catheter** into the urethral meatus and **advance slowly but firmly** by feeding it out of the remaining wrapper.
11. On entering the bladder, urine should start to drain. Advance the catheter fully to ensure the balloon is beyond the urethra.
12. **Inflate the balloon** with the 10ml of saline via the catheter side-arm.

- Warn the patient to alert you to any **pain** and **watch her face**.
- Remove the syringe and withdraw catheter until resistance is felt.
- Attach draining tube and catheter bag.
- Clean and redress the patient as necessary.
- Record the residual urinary volume.

Hints

- Some female patients are easier to catheterize in a different position—lying on their side with knees raised (seek experienced help).
- Lack of urine drainage may be caused by: **blockage of gel, empty bladder or catheter misplacement**.

- Attempt to aspirate urine using a catheter-tipped syringe. Feel for a full bladder. If there is any doubt about the position of the catheter, remove immediately (**deflating balloon first**) and seek senior advice.

Complications:

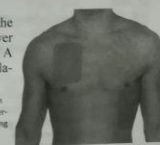
- Pain.
- Infection.
- Misplacement and trauma.

► **Beware latex allergy!**

11. Defibrillation

- Electrical defibrillation is the only effective therapy for cardiac arrest caused by ventricular fibrillation (VF) or pulseless ventricular tachycardia (VT).
- Attempt defibrillation as early as possible as **any minute of delay** **wroth life**.
- In the hospital setting, 2 types of defibrillator may be encountered: **the traditional manual defibrillator** and **the newer automated external defibrillators (AED)**.
- There are two types of AED: most are semi-automatic and advise the need for a shock, but this has to be delivered by the operator when prompted.
- Some also have the facility to enable the operator to override the device and deliver a shock manually, without any prompts. A few fully automatic AEDs are also available.

Correct position of the gel pads or AED electrodes on the patient. Ensure that they are not touching or overlapping any wires, oxygen tubing or any other conducting material. Ensure that the patient's chest is dry and shaved if particularly hairy.



12. Hand washing

- Hand washing is the single most important procedure for preventing the spread of infections.
- It is underperformed in terms of frequency and quality.
- Hands should be washed before every episode of care that involves direct contact with a patient's skin, their food, invasive devices, or dressings, and after any activity or contact that potentially results in hands becoming contaminated.
- Alcohol handrub should also be regularly used when entering or leaving a ward and before and after examining patients.

Equipment

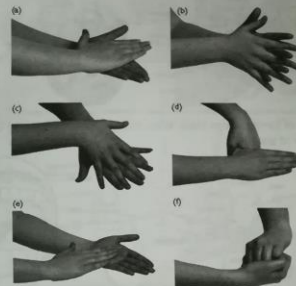
- Soap/alcohol gel.
- Disposable paper towels.
- Moisturizer (if required).

Procedure

- If hands are not visibly soiled, hand hygiene with alcohol is as, if not more, effective than handwashing.
- When required to wash our hands we should use soap and warm water. Those parts often missed are the tips of fingers, thumbs, and between the fingers.
- **The following routine is advised in most trusts**
 1. First, rub hands palm to palm.
 2. Rub right palm over the left dorsum.
 3. Rub left palm over the right dorsum.
 4. Wash palm to palm with the fingers interlaced.
 5. Wash the backs of the fingers with opposing palms with fingers interlocked.
 6. Perform rotational rubbing of the right thumb clasped with the left fist.
 7. Perform rotational rubbing of the left thumb clasped with the right fist.
 8. Wash the right palm with rotational rubbing using the fingers of the left hand.
 9. Wash the left palm with rotational rubbing using the fingers of the right hand.
 10. Wash the space between the thumbs and first fingers by interlocking them and rubbing together.
 11. Rinse away all soap and pat dry using disposable paper towels.
 12. Apply moisturizer to protect the skin from the drying effects of regular washing.

Hints

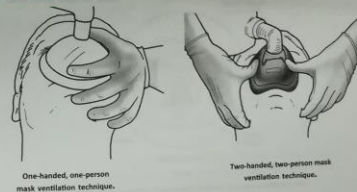
- Keep nails short, clean and polish free.
- Avoid wearing wrist watches and jewellery, especially rings with ridges or stones.
- Any cuts or abrasions should be covered with water-proof dressing.



The correct stages of hand washing as described opposite.

13. Some anaesthetic procedures

A. Face mask

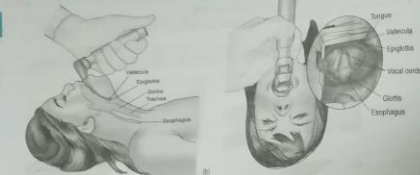


One-handed, one-person mask ventilation technique.

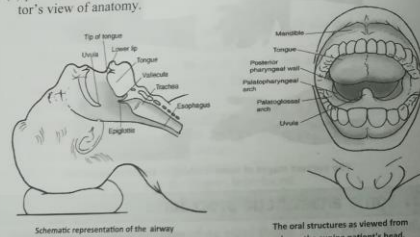
Two-handed, two-person mask ventilation technique.

B. Endo-tracheal intubation "ETT" (Oro-tracheal)

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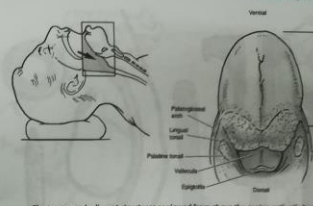
(a) position of laryngoscope blade when using a curved blade (b) Operator's view of anatomy.



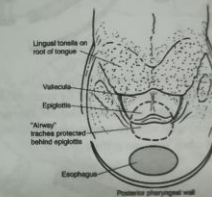
Schematic representation of the airway

The oral structures as viewed from above the supine patient's head.

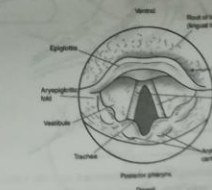
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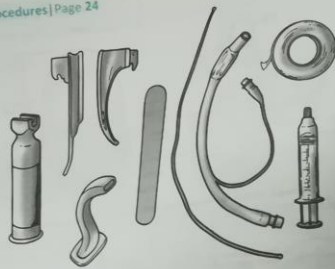
The tongue and adjacent structures as viewed from above the supine patient's head.



Structures of the hypopharynx as viewed from above the supine patient's head.

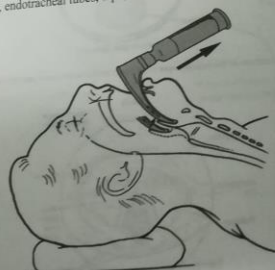


The structures of the glottis as viewed from above the supine patient's head.

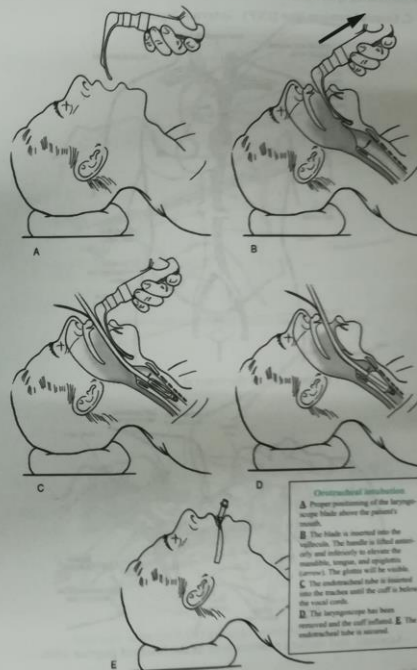


An airway/intubation kit

It contains the items most commonly needed for orotracheal intubation. **From left to right:** laryngoscope handle, laryngoscope blades, oropharyngeal airways, tongue blade, malleable stylet, endotracheal tubes, tape, and syringe.



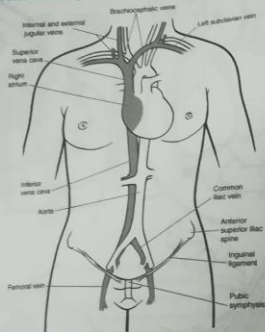
Use of the Macintosh blade. It is inserted into the vallecula to elevate the mandible, tongue, and epiglottis as a unit.



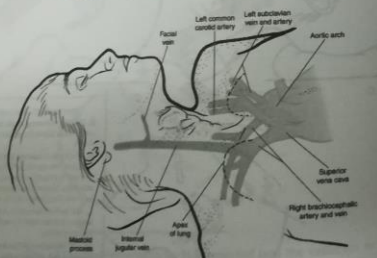
Ororotracheal intubation

- A:** Proper positioning of the laryngoscope blade above the patient's mouth.
- B:** The blade is inserted into the vallecula. The handle is lifted anteriorly and inferiorly to elevate the mandible, tongue, and epiglottis (arrow). The glottis will be visible.
- C:** The endotracheal tube is inserted into the trachea until the cuff is below the vocal cords.
- D:** The laryngoscope has been removed and the cuff inflated.
- E:** The endotracheal tube is secured.

C. Central venous line (CVP) - internal jugular



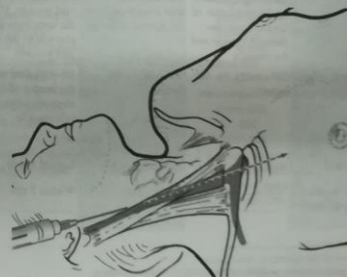
The anatomy of the central venous system.



Anatomy and surface relationships of the internal jugular vein.

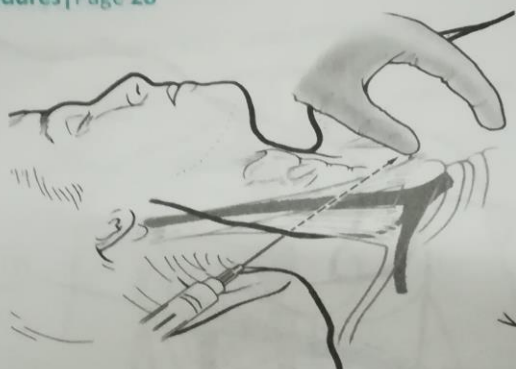


Central approach to the right internal jugular vein.



Anterior approach to the right internal jugular vein.

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Posterior approach to the right internal jugular vein.

Approaches to the Internal Jugular Vein

	Central	Anterior	Posterior
Insertion landmark	Superior apex of the triangle formed by the two heads of the sternocleidomastoid muscle and the clavicle	Medial edge of the sternocleidomastoid muscle at level of thyroid cartilage	Lateral edge of sternocleidomastoid muscle, 1/3 of the way from the clavicle to the mastoid process
Angle with skin	30° (child), 45–60° (adult)	30° (child), 45° (adult)	30–45°, dive under the border of the sternocleidomastoid muscle
Aim toward	Ipsilateral nipple	Ipsilateral nipple	Sternal notch
Internal jugular vein depth in an adult	Within 3 cm	Within 3 cm	Within 5 cm

References of the figures of this chapter:

1. Emergency medicine procedures 2003
2. Oxford handbook of clinical examination and practical skills 1st edition
3. Surgical recall 4th edition 4. An introduction to clinical emergency medicine p 20

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